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to the higher forms of research which it is the object of the institution to promote.

R. S. WOODWARD.

November 11, 1905.

ANNUAL MEETING OF THE CENTRAL BOTANISTS HELD AT ANN ARBOR,
DECEMBER 28 AND 29, 1905.

THE annual meeting of the Central Botanists was held on the afternoons of December 28 and 29 at Ann Arbor, conjointly with morning sessions of the Society for Plant Morphology and Physiology on the same days. The meeting was opened by past-president Professor Stanley Coulter, and Professor F. C. Newcombe was elected president for the ensuing year and presiding officer for this session. He with the past-president, Professor William Trelease, and Secretary-treasurer Dr. H. C. Cowles will constitute the executive committee for next year.

The following papers were read:

The Structure and Division of the Oospore in Coleochaete: CHARLES E. ALLEN.

Three species were studied—*C. scutata*, *C. soluta* and *C. pulvinata*. The oospore contains a large nucleus and eight parietal chromatophores, each of the latter containing, usually, one pyrenoid and many starch grains. In the cytoplasm are many large rounded vacuoles, which are not fat drops, but which contain varying amounts of a substance which stains blue in the triple stain. The time of germination in the spring depends upon the season, the pro-phases of the first division appearing (in *C. scutata*) about three weeks after the disappearance of the ice. Divisions were induced in the oospore of *C. soluta* by bringing the plants indoors in the fall and keeping them in changing water at a temperature of about 12°–13° C. The first and second nuclear divisions in the germination of the oospore display the characteristics respectively of the heterotypic and

homeotypic mitoses in the higher plants. From these facts it is concluded that chromosome reduction occurs immediately upon the germination of the oospore; there is, therefore, no cell generation, except the oospore itself, which contains the double number of chromosomes, and hence no sporophyte generation.

Spore Formation in Derbesia: BRADLEY M. DAVIS.

The Life History of Polysiphonia: SHIGEO YAMANOUCHI. (Presented by Dr. Davis.)

Variation of Habitat of some Bog Plants in Michigan: CHARLES A. DAVIS.

Spore Formation in the Many-spored Asci in Streptotheca and Rhyparobius: J. B. OVERTON. (Presented by Dr. Allen.)

The Division of the Nuclei in Living Filaments of Oscillatoria: EDGAR W. OLIVE. (Presented by Dr. Allen.)

Living filaments of *Oscillatoria* show, under dim illumination, two sharply differentiated regions—lens-shaped, refractive, granular bodies, alternating with clear, vacuole-like spaces. The latter are the so-called 'central bodies.' These on examination are seen to be in a state of division, and their constriction is accomplished by the growth inward from the periphery of a ring-formed partition. Every few cells apart in a filament will be seen regions of maximum division, where constriction has progressed farthest, and regions of minimum division. Thus maxima and minima alternate rhythmically with one another. The 'central bodies' prove to be nuclei, on sectioning and properly staining, which are constantly in a state of division, since they never appear to enter on a state of rest.

Cortinarius as a Mycorrhiza-producing Fungus: CALVIN H. KAUFFMAN.

It was shown that the red-colored mycelium of an undescribed species of *Cortinarius*

tinarius formed ectotrophic mycorrhiza on at least three forest plants, viz., *Acer saccharinum* Wang., *Quercus rubra* L. and *Celastrus scandens* L. In two cases the fruit-bodies were found, attached to the strands which were associated with the roots. Other trees and shrubs in the same locality, even including individuals of red oak, had no connection with the fungus.

Further Studies on the Ascus: J. HORACE FAULL.

The differences of opinion regarding the systematic position of the Laboulbeniaceæ have been in a large measure due to ignorance of the nuclear phenomena within the spore sac. An examination of a fair abundance of material shows that the young spore sac is occupied by a fusion nucleus, that three generations of nuclei follow, that as a rule four of the last generation pass to the upper end of the spore sac and break down, and that through the activity of the rest four spores are formed. These spores are formed in a way that differs in no essential respect from that already described for several of the Ascomycetes. The paper concluded with a summary of the essential phenomena of *Ascus* and spore formation in Ascomycetes, and with these the phenomena just noted in *Laboulbenia* were found to agree.

Ecological Reconnaissance of the Isle Royal Region: W. P. HILT.

Notes on Nebraska Grasses: CHARLES E. BESSEY. BRADLEY M. DAVIS,
Secretary pro tem.

SCIENTIFIC BOOKS.

A Text-book of Physiology. For medical students and physicians. By WILLIAM H. HOWELL, Ph.D., Professor of Physiology in the Johns Hopkins University. Philadelphia, W. B. Saunders and Co. 1905. Pp. 905. 8vo. Cloth, \$4.00.

The 'American Text-book of Physiology,' which had its first edition in 1896 under the

editorship of Professor Howell, was at that time and is perhaps now the most pretentious effort of American authors in physiology. It was thought that 'the advantages derived from the collaboration method' would be great in that it would give the reader the advantage of the specialist's point of view in every field of physiology. As a matter of fact these joint author text-books are proving heavy for the student and are being relegated to the field of the reference book. Users of the 'American Text-book,' who are, therefore, familiar with the uniform high excellence of the chapters written by its editor, will be more than gratified by the appearance of the present volume by Professor Howell. The author's well-known terseness of style and directness of statement permeate the book from cover to cover. The treatment is kept well within the limits set by the title-page, yet Dr. Howell has gone far afield into the most recent literature, giving us a storehouse of physiological fact and scientific theory such as one rarely finds in a modern text-book.

Much new material, evidently the accumulated experiences of the Johns Hopkins laboratories, is presented to the public for the first time. The number of new illustrations is a feature of the work. Of the two hundred and seventy-two illustrations about one half are original.

The author has departed radically from the conventional arrangement of subject matter by introducing as the second and third sections, respectively, the subjects of 'The Central Nervous System,' and 'The Special Senses.' Professor Howell has always, both as a teacher and a writer, emphasized the necessity for laboratory experience by the elementary student as a necessary preparation for the presentation of the principles of physiology. The subject of muscle and nerve, treated in the first section of the volume, of all the subdivisions of physiology, unquestionably lends itself best to experimental demonstration to the student. The facts can be more directly observed with less confusion by indeterminate factors, and the subject matter can be used to give a more rigid training in experimental technique. These three chapters, 'i. e., on'